***** QUERY RESULTS *****

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=> d his 141

     (FILE 'WPIX' ENTERED AT 15:41:08 ON 14 OCT 2009)
L41           6 S L36 OR L40

=> d que 141
L5       187800 SEA FILE=HCAPLUS ABB=ON  PLU=ON  (SULFURIC OR SULPHURIC) (W)
                ACID
L9        83235 SEA FILE=HCAPLUS ABB=ON  PLU=ON  (SULFUR OR SULPHUR) (W)
                (DIOXIDE)
L11      910900 SEA FILE=HCAPLUS ABB=ON  PLU=ON  OXYGEN
L13       12693 SEA FILE=HCAPLUS ABB=ON  PLU=ON  (SULFUR OR SULPHUR) (W)
                (TRIOXIDE)
L14      110834 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L5 AND (PREP? OR PRODUC? OR
                PROCEDURE? OR SYNTHES? OR MAKE# OR MADE OR MAKING)
L15        4231 SEA FILE=HCAPLUS ABB=ON  PLU=ON  (CONTACT?) (2A) (STAGE# OR
                MAIN OR PRIMAR? OR SECONDAR?)
L16         163 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L11 AND L15
L30          13 SEA FILE=WPIX ABB=ON  PLU=ON  L14 AND L16
L31          13 SEA FILE=WPIX ABB=ON  PLU=ON  L30 AND L5
L32           2 SEA FILE=WPIX ABB=ON  PLU=ON  L31 AND (FEED GAS?)
L33          13 SEA FILE=WPIX ABB=ON  PLU=ON  L31 AND (L9 OR L11 OR L13)
L34           4 SEA FILE=WPIX ABB=ON  PLU=ON  L31 AND L9
L35           5 SEA FILE=WPIX ABB=ON  PLU=ON  L31 AND L13
L36           6 SEA FILE=WPIX ABB=ON  PLU=ON  L32 OR L34 OR L35
L37           7 SEA FILE=WPIX ABB=ON  PLU=ON  L33 AND (VOLUME# OR VOL# OR
                PERCENT# OR PCT# OR CONTENT#)
L38           8 SEA FILE=WPIX ABB=ON  PLU=ON  L36 OR L37
L39           7 SEA FILE=WPIX ABB=ON  PLU=ON  L38 NOT CARBON SILICA
L40           6 SEA FILE=WPIX ABB=ON  PLU=ON  L39 NOT SODIUM SULFATE
L41           6 SEA FILE=WPIX ABB=ON  PLU=ON  L36 OR L40


=> d 141 1-6 iall abeq tech abex

L41  ANSWER 1 OF 6  WPIX COPYRIGHT 2009       THOMSON REUTERS on STN
ACCESSION NUMBER:     2009-J20776 [33]   WPIX
TITLE:                Sulfuric acid production
                      from sulfur dioxide by contact
                      process, includes reducing water vapor content
                      of process air or waste sulfuric acid
                      cleavage gas by cooling
DERWENT CLASS:        E36
INVENTOR:             BOGENSTAETTER T; NICKEL J T
PATENT ASSIGNEE:      (BADI-C) BASF SE
COUNTRY COUNT:        122

PATENT INFORMATION:

      PATENT NO      KIND DATE     WEEK     LA  PG          MAIN IPC
      ------------------------------------------------------------------
      WO 2009060022   A1 20090514 (200933)* DE  15[2]

APPLICATION DETAILS:

      PATENT NO      KIND                  APPLICATION    DATE
      ------------------------------------------------------------------
      WO 2009060022 A1                     WO 2008-EP65044 20081106
```

PRIORITY APPLN. INFO: EP 2007-120139 20071107
INT. PATENT CLASSIF.:
IPC ORIGINAL: C01B0017-00 [I,C]; C01B0017-76 [I,A]
BASIC ABSTRACT:
WO 2009060022 A1 UPAB: 20090527
NOVELTY - In the production of sulfuric acid (H2SO4) by oxidizing process gases containing sulfur dioxide (SO2) (obtained by burning liquid sulfur with externally supplied process air or by cleaving waste H2SO4) to form sulfur trioxide (SO3) to be converted into H2SO4 by the contact process, the water vapor content of the externally supplied process air or of the waste H2SO4 cleavage gas is reduced by cooling.
USE - For production of H2SO4 (a key product in the chemical industry) from elemental sulfur or impure waste H2SO4 (especially from the organic chemical, petrochemical or metallurgical industry).
ADVANTAGE - The amount of water introduced into the H2SO4 during the process is reduced, so that need for energy-intensive concentration of the obtained H2SO4 for use in applications requiring highly concentrated H2SO4 (e.g. nitrations to produce dinitrotoluene) is minimized. Cooling of the process air before compression also reduces the amount of energy required to operate the compressor.
DESCRIPTION OF DRAWINGS - The figure shows a flow diagram of a sulfuric acid production plant using a double-contact process (giving an overall sulfur dioxde conversion of more than 99.7%).
Air stream (1)
Liquid sulfur stream (2)
Feed water stream (3)
Water vapor stream (4)
Diluting water stream (5)
Sulfuric acid and oleum stream (6)
Exhaust gas stream (7)
Liquid sulfur combustion plant (VS1)
First and second stages of double contact process, for catalytic oxidation of sulfur dioxide with atmospheric oxygen (VS2, VS4)
Intermediate and final absorption stages, for producing sulfuric acid and oleum (VS3, VS5)
Heat exchanger (WT)
MANUAL CODE: CPI: E31-F03
TECH
INORGANIC CHEMISTRY - Preferred Process: The externally supplied process air is cooled to reduce the water vapor content before being passed through a compressor. The externally supplied process air or the waste H2SO4 cleavage gas is cooled by direct contact with a cooling medium, specifically water at 1-10 degrees C, sulfuric acid at -5 to +10 degrees C or brine; by indirect cooling with a cooling medium, specifically in a conventional air conditioning plant. The externally process air or cleavage gas is especially cooled to below 5 degrees C, to reduce its water vapor content to less than 1 vol. %.
ABEX EXAMPLE - No relevant example given.

L41 ANSWER 2 OF 6 WPIX COPYRIGHT 2009 THOMSON REUTERS on STN
ACCESSION NUMBER: 2008-F38700 [35] WPIX
DOC. NO. CPI: C2008-175838 [35]
DOC. NO. NON-CPI: N2008-421874 [35]
TITLE: Continuous catalytic oxidation of gas containing sulfur dioxide and oxygen, in sulfuric acid production plant, is carried out in quasi-isothermal manner to keep catalyst active
DERWENT CLASS: E36; J04; V04

INVENTOR: ERKES B; HAVERKAMP V; KUERTEN M; KURTEN M
PATENT ASSIGNEE: (FARB-C) BAYER TECHNOLOGY SERVICES GMBH
COUNTRY COUNT: 121

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
WO 2008052649	A1	20080508	(200835)*	DE	33[5]	
DE 102006051899	A1	20080515	(200835)	DE		
EP 1979270	A1	20081015	(200868)	DE		
WO 2008052649	A8	20090522	(200934)	EN		
NO 2009001768	A	20090529	(200946)	NO		
AU 2007315318	A1	20080508	(200954)	EN		
CA 2668059	A1	20080508	(200960)	EN		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
WO 2008052649	A1	WO 2007-EP8910	20071013
DE 102006051899	A1	DE 2006-102006051899	20061031
AU 2007315318	A1	AU 2007-315318	20071013
EP 1979270	A1	EP 2007-818981	20071013
EP 1979270	A1 PCT Application	WO 2007-EP8910	20071013
WO 2008052649	A8	WO 2007-EP8910	20071013
NO 2009001768	A PCT Application	WO 2007-EP8910	20071013
NO 2009001768	A	NO 2009-1768	20090505
CA 2668059	A1	CA 2007-2668059	20071013
CA 2668059	A1 PCT Application	WO 2007-EP8910	20071013
CA 2668059	A1 PCT Nat. Entry	CA 2007-2668059	20090427

FILING DETAILS:

PATENT NO	KIND		PATENT NO	
EP 1979270	A1	Based on	WO 2008052649	A
AU 2007315318	A1	Based on	WO 2008052649	A
CA 2668059	A1	Based on	WO 2008052649	A

PRIORITY APPLN. INFO: DE 2006-102006051899 20061031
INT. PATENT CLASSIF.:
IPC ORIGINAL: B01D0053-86 [I,A]; B01D0053-86 [I,C]; B01J0008-02 [I,C]; B01J0008-02 [I,C]; B01J0008-02 [I,C]; B01J0008-06 [I,A]; B01J0008-06 [I,A]; C01B0017-00 [I,C]; C01B0017-00 [I,C]; C01B0017-00 [I,C]; C01B0017-74 [I,A]; C01B0017-765 [I,A]; C01B0017-765 [I,A]; C01B0017-80 [I,A]; C01B0017-80 [I,A]; F01N0003-28 [I,A]; F01N0003-28 [I,C]
ECLA: C01B0017-765B; C01B0017-80B
BASIC ABSTRACT:

WO 2008052649 A1 UPAB: 20090602

NOVELTY - In a method for continuous, complete or partial, catalytic oxidation of a starting gas containing sulfur dioxide (SO2) and oxygen (O2), the catalyst is kept active by carrying out the process in quasi-isothermal manner, with supply or abstraction of energy.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for apparatus for continuous, complete or partial, catalytic oxidation of a starting gas containing SO2 and O2, comprising at least one tubular contact apparatus, which is an upright heat exchanger consisting of at lesat one double-walled tube. The inner tube is a catalyst-filled reaction tube, around which heat is

transferred by cooling medium. An absorber for separating sulfur trioxide is installed downstream of the contact apparatus.

USE - The process and apparatus are useful in plants for the large-scale production of sulfuric acid by the double-contact process, to process SO2-containing gases to form further sulfuric acid (suitable for use e.g. in metallurgical processes) and reduce environmental pollution.

ADVANTAGE - An inexpensive, economical, ecologically acceptable method is provided for producing sulfuric acid from concentrated starting gases containing more than 13.5 volume % SO2 and utilizing waste gases containing less than 5 volume % SO2. Gases containing 0.1-66 volume % SO2 can be at least partially converted to SO3-containing gas by oxidation with O2, so that the process is highly flexible. Conversions of more than 90% are obtainable using conventional vanadium pentoxide catalysts.

DESCRIPTION OF DRAWINGS - The figure shows a schematic diagram of a plant for oxidation of a gas containing 13-30 volume % sulfur dioxide, by partial conversion in tubular contact apparatus, optional preadsorption and mixing with residual gas to give a residual gas containing less than 13 volume % sulfur dioxide, for further processing in a main contact plant.

Gas dryer (1)
Gas preheater (2)
First main contact (3)
Second main contact (4)
Oleum/intermediate absorber (5)
Final absorber (6)
Flue (7)
Quasi-isothermally operated tubular contact apparatus (8)
Heater (9)
Cooler (10)
Blower or pump (11)
Regulating valve (12)
Process gas inlet line (a)
Diluting air line (b)
Gas line to first main contact (c)
Technical oxygen line (d)
Gas line to oleum/intermediate absorber (e)
Gas line to second main contact (f)
Gas line to final absorber (g)
Gas line to flue (h)
Gas line to tubular contact apparatus (i)
Circulation line cooler/heater (k)
Gas line from tubular contact apparatus to mixing point (m)
Gas line in by-pass tubular contact apparatus to mixing point (n)
Heat abstraction (Q ab)
Heat supply (Q zu)

MANUAL CODE: CPI: E11-E01; E31-F03; J04-E04; J04-E06; J04-E09A; N03-C01; N07-C01
EPI: V04-T03

TECH

CHEMICAL ENGINEERING - Preferred Process: The process is carried out in tubular contact apparatus having at least one reaction tube filled with catalyst. Energy is supplied or abstracted via an intermediate circuit. The catalyst is provided with inert material to optimize energy abstraction; preferably the reactivity of the catalyst is adjusted by mixing with inert material in ratio 1:100 to 100:1. The starting gas has SO2 content 0.1-66 vol. %. The catalyst is of vanadium pentoxide, optionally containing cesium. The starting gas is supplied with air and/or technical oxygen, such that the volume ratio of O2 to SO2 in the gas is 0.5-1.2. Energy supply or abstraction for the reaction tubes is carried out with cooling medium in cocurrent; in particular energy abstraction is carried out using air and a heat transfer

index of 20-80 W/m3.K is set up between the inner tube and cooling medium. At least one further contact stage is provided downstream of the tubular contact apparatus, for further treatment of partially oxidized gas with SO2 content up to 13.5 vol . %. 35% or 100% oleum is prepared by partial condensation. Preferred Apparatus: The reaction tube has a nominal diameter of 25-150 mm and a length of 1-12 m. The following are provided downstream of the tubular contact apparatus: optionally a preabsorber; one or more contact stages, optionally with one or more oleum/intermediate absorbers; a final absorber; and optionally an exhaust gas purifying plant.

ABEX EXAMPLE - Partial treatment of outlet gases containing 13-30 vol . % sulfur dioxide (SO2) was carried out in apparatus as shown in the figure, having a by-pass circuit. A partial stream of gas was passed through quasi-isothermally operated tubular contact apparatus (8), having an indirectly operated cooling and/or heating circuit consisting of a cooler (10), blower or pump (11) and/or heater (9). The remainder of the gas was adjusted via throttle valve (12) to SO2 concentration less than 13 vol. % before entry into the first main contact (3) at the mixing point in gas line (c). The starting gas (a) was mixed with air (b) or oxygen (O2) (d) to provide sufficient O2 to oxidize all of the SO2 to sulfur trioxide (SO3); dried (1); and preheated (2) to the inlet temperature for the catalyst of the main contact (3) and the tubular contact apparatus (8). The mixture from the contact apparatus was passed (m), together with the gases supplied (n) via the by-pass line, to the mixing point in line (c), to give a gas containing ca. 8 vol. % SO2, to be supplied to the first contact stage for further conventional processing. The tubular contact apparatus was heated and/or cooled so that the catalyst was at the optimum temperature for the exothermic oxidation reaction, i.e. 420-640degrees C for vanadium pentoxide catalyst. Heat abstracted from the cooling circuit region at 220-550 (preferably 350-450)degrees C was utilized (preferably as low pressure steam) by heat exchange (10). A conversion of more than 92% could be achieved while maintaining a catalyst temperature of 450degrees C to give SO2 concentrations of less than 5 vol. %, so that environmental pollution was greatly reduced at low cost. The by-pass arrangement also allowed a more than 50% greater amount of SO2 to be converted into sulfuric acid.

L41 ANSWER 3 OF 6 WPIX COPYRIGHT 2009 THOMSON REUTERS on STN
ACCESSION NUMBER: 2006-231014 [24] WPIX
DOC. NO. CPI: C2006-075808 [24]
TITLE: Producing sulfuric acid involves partly reacting starting gas of sulfur dioxide with molecular oxygen in one contact with one contact stage to form sulfur trioxide followed by introducing into absorber and converting to sulfuric acid
DERWENT CLASS: E36; J04
INVENTOR: DAUM K; DAUM K H; RIEDER J; STORCH H
PATENT ASSIGNEE: (OUTO-C) OUTOKUMPU OY; (OUTO-C) OUTOKUMPU TECHNOLOGY OY; (OUTO-C) OUTOKUMPU TECHNOLOGY OYJ; (DAUM-I) DAUM K; (RIED-I) RIEDER J; (STOR-I) STORCH H
COUNTRY COUNT: 109

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC

WO 2005105666	A2	20051110	(200624)*	EN	28[5]
DE 102004022506	A1	20051208	(200624)	DE	
FR 2869892	A1	20051111	(200624)	FR	
EP 1742869	A2	20070117	(200706)	EN	
AU 2005238149	A1	20051110	(200724)	EN	
IN 2006MN01245	P3	20070608	(200748)	EN	
CN 101001808	A	20070718	(200803)	ZH	
BR 2005010676	A	20071226	(200804)	PT	
US 20080145290	A1	20080619	(200843)	EN	
ZA 2006009163	A	20080730	(200856)	EN	34

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
WO 2005105666	A2	WO 2005-EP3798	20050412
DE 102004022506	A1	DE 2004-102004022506	20040505
AU 2005238149	A1	AU 2005-238149	20050412
BR 2005010676	A	BR 2005-10676	20050412
CN 101001808	A	CN 2005-80014112	20050412
EP 1742869	A2	EP 2005-716570	20050412
EP 1742869	A2	WO 2005-EP3798	20050412
IN 2006MN01245	P3	WO 2005-EP3798	20050412
CN 101001808	A	WO 2005-EP3798	20050412
BR 2005010676	A	WO 2005-EP3798	20050412
US 20080145290	A1	WO 2005-EP3798	20050412
FR 2869892	A1	FR 2005-51177	20050504
IN 2006MN01245	P3	IN 2006-MN1245	20061020
US 20080145290	A1	US 2007-579435	20070821
ZA 2006009163	A	ZA 2006-9163	20050412

FILING DETAILS:

PATENT NO	KIND		PATENT NO	
EP 1742869	A2	Based on	WO 2005105666	A
AU 2005238149	A1	Based on	WO 2005105666	A
CN 101001808	A	Based on	WO 2005105666	A
BR 2005010676	A	Based on	WO 2005105666	A

PRIORITY APPLN. INFO: DE 2004-102004022506 20040505
INT. PATENT CLASSIF.:
MAIN: C01B017-76; C01B017-765
SECONDARY: C01B017-80
IPC ORIGINAL: C01B [I,S]; C01B0017-00 [I,C]; C01B0017-00 [I,C]; C01B0017-76 [I,A]; C01B0017-765 [I,A]; C01B0017-765 [I,A] ; C01B0017-79 [I,A]; C01B0017-80 [I,A]
IPC RECLASSIF.: C01B0017-00 [I,C]; C01B0017-765 [I,A]
ECLA: C01B0017-765B
USCLASS NCLM: 423/242.100
NCLS: 422/161.000; 423/244.100
BASIC ABSTRACT:

WO 2005105666 A2 UPAB: 20060410
NOVELTY - A producing (P1) sulfuric acid involves i) partly reacting a starting gas containing sulfur dioxide (16 volume%) with molecular oxygen in at least one contact (2,3) with at least one contact stage (6-1) to form sulfur trioxide; ii) introducing the sulfur-trioxide -containing gas produced, into an absorber (4,5) and converting to sulfuric acid. A volumetric ratio of sulfur dioxide:oxygen is more than 2.67:1.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for a plant for producing the sulfuric acid comprising at least one contact stage (6-1) for reacting the starting gas, and at least one absorber (5). The inlet region of the first contact stage (6-1) is connected with the outlet region of at least one contact stage (6-1, 6-2, 6-3, 6-4, 6-5) and/or with the outlet region of at least one (4,5) via at least one recirculation conduits (17,18).

USE - For producing sulfuric acid (claimed).

ADVANTAGE - The method is inexpensive. Only one contact with down stream absorber is provided. A very small amounts of waste gas are produced so that the specific emission, based on the amount of sulfuric acid formed are lower as compared to the conventional processes. Also, no drying tower for drying the ambient air is required for performing the process. The plant does not require gas blower for conveying the process gases through the contact and absorption stages.

MANUAL CODE: CPI: E11-E; E31-F03; J04-E01; J04-E06; N03-C01; N07-C01

TECH

MECHANICAL ENGINEERING - Preferred Plant: The recirculation conduit (17,18) leads from the outlet region of the first contact (2) to the inlet region of the first contact stage. The recirculation conduit comprises 3 - 5 contact stages combined with 1 or 2 contacts. The recirculation conduit additionally comprises a sulfur burner with a combustion chamber for the combustion of elementary sulfur with tonnage oxygen or air, and that the sulfur burner and/or the inlet region of the combustion chamber is connected with the outlet region of the contact stages and/or with the outlet region of at least one absorber.

ORGANIC CHEMISTRY - Preferred Method: The contact gas is produced by combustion of elementary sulfur with tonnage oxygen. The contact gas is supplied to the first contact stage containing the catalyst with a temperature of at least 450 (preferably at least 470)degreesC. The contact gas is supplied to the first contact stage with a pressure of 1 - 30 (preferably 3 - 12)bar. The temperature in the contact stage is below the temperature which leads to damage of the catalyst, but above the operating temperature of the catalyst. The downstream of all the contact stages are combined to 1 or 2 contacts (2,3). The process gas leaving the contact stages is mixed with oxygen, upon passage through an intermediate absorber (4), is adjusted to an inlet temperature suitable for the next contact stages (6-2, 6-3, 6-4, 6-5), and is supplied to the respectively next contact stages (6-2, 6-3, 6-4, 6-5). At least one partial stream is withdrawn from the process gas leaving the first contact stage and/or at least one process gas leaving the second contact stage, or from the process gas leaving the intermediate absorber and/or the final absorber. The partial stream is mixed with the starting gas before entering the first contact stage and/or with the combustion gas used for the combustion of elementary sulfur for producing the sulfur-dioxide-containing starting gas and/or is supplied directly to the sulfur burner. Preferred Components: The contact gas supplied to the first contact stage has a sulfur dioxide content of more than 20 (preferably more than 40, particularly more than 90)vol.%. The volumetric ratio of sulfur dioxide:oxygen is more than 4:1 (preferably more than 6:1, particularly more than 10:1). The contact gas supplied to the first contact stage comprises (vol.%) sulfur dioxide (60 - 99.99, preferably 80 - 99.99, particularly 90 - 95), oxygen (0.01 - 20, preferably 0.01 - 10, particularly 3 - 7), sulfur trioxide (0.01 - 20, preferably 0.01 - 5) and nitrogen or another inert gas (0 - 10, preferably 0 - 5)vol.%. The first

contact stage comprises a catalyst containing vanadium pentoxide.

L41 ANSWER 4 OF 6 WPIX COPYRIGHT 2009 THOMSON REUTERS on STN
ACCESSION NUMBER: 2004-377764 [36] WPIX
DOC. NO. CPI: C2004-141974 [36]
TITLE: Contact process for sulfuric acid production comprises mixing the feed gas with a recycle gas to produce a contact gas with a high sulfur dioxide content
DERWENT CLASS: E36
INVENTOR: ANASTASIJEVIC N; ANSTASIJEVIC N; DAUM K; DAUM K H; MUELLER H; MULLER H; SEITZ E; EKKEHART S; HEINZ D K; HERMANN M; NIKOLA A
PATENT ASSIGNEE: (OUTO-C) OUTOKUMPU OY; (ANAS-I) ANASTASIJEVIC N; (DAUM-I) DAUM K; (MULL-I) MULLER H; (SEIT-I) SEITZ E; (OYJO-I) OYJ O
COUNTRY COUNT: 104

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
DE 10249782	A1	20040506	(200436)*	DE	26[9]	
WO 2004037719	A1	20040506	(200436)	EN		
AU 2003274054	A1	20040513	(200468)	EN		
EP 1565402	A1	20050824	(200556)	EN		
BR 2003015534	A	20050823	(200557)	PT		
TW 2004013246	A	20040801	(200581)	ZH		
JP 2006503782	W	20060202	(200611)	JA	26	
CN 1708453	A	20051214	(200636)	ZH		
IN 2005MN00302	P3	20051202	(200639)	EN		
KR 2005073578	A	20050714	(200643)	KO		
US 20060245997	A1	20061102	(200672)	EN		
ZA 2005003289	A	20061025	(200674)	EN	53	
TW 250125	B1	20060301	(200717)	ZH		
AU 2003274054	B2	20090212	(200951)	EN		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
DE 10249782 A1		DE 2002-10249782	20021024
TW 2004013246 A		TW 2003-128992	20031020
TW 250125 B1		TW 2003-128992	20031020
AU 2003274054 A1		AU 2003-274054	20031021
BR 2003015534 A		BR 2003-15534	20031021
CN 1708453 A		CN 2003-80102005	20031021
EP 1565402 A1		EP 2003-758033	20031021
WO 2004037719 A1		WO 2003-EP11659	20031021
EP 1565402 A1		WO 2003-EP11659	20031021
BR 2003015534 A		WO 2003-EP11659	20031021
JP 2006503782 W		WO 2003-EP11659	20031021
IN 2005MN00302 P3		WO 2003-EP11659	20031021
KR 2005073578 A		WO 2003-EP11659	20031021
US 20060245997 A1		WO 2003-EP11659	20031021
JP 2006503782 W		JP 2004-545919	20031021
ZA 2005003289 A		ZA 2005-3289	20031021
IN 2005MN00302 P3		IN 2005-MN302	20050419

KR 2005073578 A KR 2005-707061 20050422
US 20060245997 A1 US 2006-532326 20060516
AU 2003274054 B2 AU 2003-274054 20031021

FILING DETAILS:

PATENT NO	KIND		PATENT NO	
AU 2003274054	A1	Based on	WO 2004037719	A
EP 1565402	A1	Based on	WO 2004037719	A
BR 2003015534	A	Based on	WO 2004037719	A
JP 2006503782	W	Based on	WO 2004037719	A
KR 2005073578	A	Based on	WO 2004037719	A
AU 2003274054	B2	Based on	WO 2004037719	A

PRIORITY APPLN. INFO: DE 2002-10249782 20021024
INT. PATENT CLASSIF.:
MAIN: C01B017-74; C01B017-765
SECONDARY: C01B017-76
IPC ORIGINAL: B01J0010-00 [I,A]; B01J0010-00 [I,C]; B01J0008-04 [I,A]; B01J0008-04 [I,C]; C01B [I,S]; C01B0017-00 [I,C]; C01B0017-69 [I,A]; C01B0017-765 [I,A]; C01B0017-00 [I,C]
IPC RECLASSIF.: C01B0017-00 [I,C]; C01B0017-765 [I,A]
ECLA: C01B0017-765B
USCLASS NCLM: 423/522.000
NCLS: 422/188.000; 422/189.000
JAP. PATENT CLASSIF.:
MAIN/SEC.: C01B0017-765 A
FTERM CLASSIF.: 4G043
BASIC ABSTRACT:

DE 10249782 A1 UPAB: 20090811

NOVELTY - Production of sulfuric acid by reacting a sulfur dioxide (SO2)-containing feed gas with oxygen in at least two successive contact stages and passing the resulting sulfur trioxide (SO3)-containing gas to an absorber comprises withdrawing a side stream of SO2- and SO3-containing gas from a contact stage other than the last and mixing it with the feed gas to produce a contact gas containing more than 13 volume% SO2.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for apparatus for producing sulfuric acid, comprising at least two successive main contact stages and at least one absorber, in which the first main contact stage is preceded by at least one pre contact stage and the outlet of a main contact stage other than the last is connected to the inlet of the first pre contact stage via a recycle line.

USE - For producing sulfuric acid.

ADVANTAGE - Recycling the side stream allows a feed gas with a higher than normal sulfur dioxide content to be used without overheating the catalyst in the first contact stage, which can increase the sulfuric acid production capacity by as much as 50%. MANUAL CODE: CPI: E31-F03
TECH

CHEMICAL ENGINEERING - Preferred Process: The contact gas contains 14-25 vol.% sulfur dioxide (SO2). Air or technical oxygen (O2) is added to the feed gas to give an O2:SO2 volume ratio below 0.8:1 and the side stream is then added in an amount of 15-35%. The contact gas is fed into a pre contact zone comprising one or two pre contact stages. The gas from the pre contact zone contains no more than 13 vol.% SO2 and is passed to the first contact stage of a first main contact zone, optionally via a pre absorber. The gas from the first main contact zone is passed to a second main contact zone via an intermediate absorber.

The gas from the second main contact zone is passed to a final absorber. Part of the gas from the pre contact zone bypasses the pre absorber and is sent directly to the first main contact zone. The gas from the final absorber is scrubbed with hydrogen peroxide, ammonia or sodium hydroxide solution. The side stream is cooled below 500degreesC before being recycled. The amount recycled is controlled on the basis of the exit temperature of the gas from the first main contact or pre contact stage.

ABEX EXAMPLE - A feed gas containing (by volume) 36% sulfur dioxide (SO2) was mixed with air, oxygen and recycle gas to produce a contact gas containing 17.11% SO2. Sulfuric acid production using this gas was 2902 tonne/day, compared with 1935 tonne/day using a contact gas containing 12.24% SO2.

L41 ANSWER 5 OF 6 WPIX COPYRIGHT 2009 THOMSON REUTERS on STN
ACCESSION NUMBER: 1995-319840 [41] WPIX
CROSS REFERENCE: 1995-045162; 1995-045163; 1997-050626
DOC. NO. CPI: C1995-142108 [41]
TITLE: Improved sulphide-containing gas desulphurising method - involves use of a regeneratable sorbent that produces sulphur di:oxide off-gas in regeneration
DERWENT CLASS: E36; J01
INVENTOR: CAMPBELL W M; GUNNAR B H; HENNINGSEN G B
PATENT ASSIGNEE: (PULL-C) KELLOGG BROWN & ROOT INC; (PULL-C) KELLOGG CO M W
COUNTRY COUNT: 9

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
US 5447702	A	19950905	(199541)*	EN	8[4]	
ZA 9503129	A	19960327	(199619)#	EN	24[0]	
EP 738538	A1	19961023	(199647)#	EN	12[4]	
JP 08299741	A	19961119	(199705)#	JA	9[4]	
CA 2146886	A	19961013	(199707)#	EN		
CN 1135371	A	19961113	(199804)#	ZH		
EP 738538	B1	19980701	(199830)#	EN		
DE 69503221	E	19980806	(199837)#	DE		
KR 367313	B	20030225	(200356)#	KO		
CN 1090518	C	20020911	(200525)#	ZH		
JP 3665382	B2	20050629	(200544)#	JA	13	
CA 2146886	C	20051115	(200578)#	EN		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
US 5447702	A CIP of	US 1993-90420	19930712
US 5447702	A CIP of	US 1993-90601	19930712
US 5447702	A	US 1994-206569	19940304
CA 2146886	A	CA 1995-2146886	19950412
CA 2146886	C	CA 1995-2146886	19950412
DE 69503221	E	DE 1995-69503221	19950418
EP 738538	A1	EP 1995-105760	19950418
EP 738538	B1	EP 1995-105760	19950418
DE 69503221	E	EP 1995-105760	19950418
ZA 9503129	A	ZA 1995-3129	19950418
JP 08299741	A	JP 1995-107626	19950501

JP 3665382 B2	JP 1995-107626 19950501
KR 367313 B	KR 1995-11060 19950504
CN 1135371 A	CN 1995-105723 19950510
CN 1090518 C	CN 1995-105723 19950510

FILING DETAILS:

PATENT NO	KIND	PATENT NO
DE 69503221 E	Based on	EP 738538 A
JP 3665382 B2	Previous Publ	JP 08299741 A
KR 367313 B	Previous Publ	KR 96040425 A

PRIORITY APPLN. INFO: US 1994-206569 19940304
US 1993-90420 19930712
US 1993-90601 19930712
CA 1995-2146886 19950412
ZA 1995-3129 19950418
EP 1995-105760 19950418
DE 1995-69503221 19950418
JP 1995-107626 19950501
KR 1995-11060 19950504
CN 1995-105723 19950510

INT. PATENT CLASSIF.:
MAIN: B01D053-02; B01D053-50; B01D053-52
SECONDARY: B01D053-08; B01D053-10
IPC RECLASSIF.: B01D [I,S]; B01D0053-02 [I,A]; B01D0053-02 [I,C]; B01D0053-06 [I,C]; B01D0053-06 [I,C]; B01D0053-12 [I,A]; B01D0053-12 [I,A]; B01D0053-14 [I,A]; B01D0053-14 [I,C]; B01D0053-34 [I,A]; B01D0053-34 [I,C]; B01D0053-48 [I,A]; B01D0053-48 [I,C]; B01D0053-50 [I,A]; B01D0053-50 [I,A]; B01D0053-50 [I,C]; B01D0053-50 [I,C]; B01D0053-52 [I,A]; B01D0053-81 [I,A]; B01D0053-81 [I,C]; B01D0053-83 [I,A]; B01D0053-83 [I,C]; B01J [I,S]; B01J0020-30 [I,C]; B01J0020-34 [I,A]; B01J0008-08 [I,A]; B01J0008-08 [I,C]; C01B0017-00 [I,C]; C01B0017-04 [I,A]; C01B0017-50 [I,A]; C01B0017-56 [I,A]; C01B0017-60 [I,A]; C01B0017-74 [I,A]; C10J0003-00 [I,C]; C10J0003-46 [I,A]; C10J0003-46 [I,C]; C10J0003-54 [I,A]; C10J0003-56 [I,A]; C10J0003-84 [I,A]; C10K0001-00 [I,C]; C10K0001-30 [I,A]; C10L0003-00 [I,C]; C10L0003-10 [I,A]
ECLA: B01D0053-52; B01D0053-83; C01B0017-04B1; C01B0017-50D; C01B0017-74; C10J0003-46; C10J0003-54; C10J0003-56; C10J0003-84; C10K0001-30

JAP. PATENT CLASSIF.:
MAIN/SEC.: B01D0053-34 123 D; C10L0003-00 B; B01D0053-12 (ZAB); B01D0053-14 A (ZAB); B01D0053-34 (ZAB); C10L0003-00 B (ZAB)

FTERM CLASSIF.: 4D002; 4D012; 4D020; 4H014; 4D002/AA03; 4D020/AA06; 4D002/BA01; 4D020/BA03; 4D002/BA05; 4D020/BA08; 4D020/BB01; 4D002/CA08; 4D020/CA08; 4D002/CA09; 4D012/CA12; 4D012/CD01; 4D012/CE03; 4D012/CF04; 4D012/CF05; 4D012/CF10; 4D012/CH01; 4D012/CK01; 4D012/CK07; 4D002/DA11; 4D002/EA11; 4D002/EA14; 4D002/GA01; 4D002/GB02; 4D002/GB03; 4D002/GB20

BASIC ABSTRACT:

US 5447702 A UPAB: 20060131

An improvement for a sulphide-containing gas desulphurising method, comprising: a) separating the sulphided sorbent into a primary and secondary portion; b) contacting the secondary portion (of amount insufficient to

produce an exothermic reaction producing a temperature of 700°C when contacted with oxygen in the transport regenerator) with oxygen -containing gas in the transport regenerator in a single pass; c) combining the regenerated sorbent with the primary portion of sulphided sorbent; and d) recycling the combined sorbent to the transport absorber: for the following method: i) feed gas is contacted with a particulated metallic zinc oxide-based sorbent in a transport absorber riser to form an effluent gas of reduced sulphide content and containing the sorbent in suspension; ii) the effluent gas and sorbent are separated; iii) the sorbent is regenerated by contacting it with oxygen-containing gas in a transport regenerator to form SO2 regeneration off-gas; iv) the sorbent and off-gas are separated; and v) the sorbent is recycled to the transport absorber riser.

USE - Fluid bed desulphurisation using a regenerable sorbent.

ADVANTAGE - The sorbent used is regenerable, and the off-gas can have a SO2 concentration suitable for sulphuric acid manufacture or reduction to sulphur.

MANUAL CODE: CPI: E11-Q02; E31-F01C; E35-C; J01-E02B

Member(0002)

ABEQ ZA 9503129 A UPAB 20060131

An improvement for a sulphide-containing gas desulphurising method, comprising: a) separating the sulphided sorbent into a primary and secondary portion; b) contacting the secondary portion (of amount insufficient to produce an exothermic reaction producing a temperature of 700°C when contacted with oxygen in the transport regenerator) with oxygen -containing gas in the transport regenerator in a single pass; c) combining the regenerated sorbent with the primary portion of sulphided sorbent; and d) recycling the combined sorbent to the transport absorber: for the following method: i) feed gas is contacted with a particulated metallic zinc oxide-based sorbent in a transport absorber riser to form an effluent gas of reduced sulphide content and containing the sorbent in suspension; ii) the effluent gas and sorbent are separated; iii) the sorbent is regenerated by contacting it with oxygen-containing gas in a transport regenerator to form SO2 regeneration off-gas; iv) the sorbent and off-gas are separated; and v) the sorbent is recycled to the transport absorber riser.

USE - Fluid bed desulphurisation using a regenerable sorbent.

ADVANTAGE - The sorbent used is regenerable, and the off-gas can have a SO2 concentration suitable for sulphuric acid manufacture or redn. to sulphur.

Member(0004)

ABEQ JP 08299741 A UPAB 20060131

An improvement for a sulphide-containing gas desulphurising method, comprising: a) separating the sulphided sorbent into a primary and secondary portion; b) contacting the secondary portion (of amount insufficient to produce an exothermic reaction producing a temperature of 700°C when contacted with oxygen in the transport regenerator) with oxygen -containing gas in the transport regenerator in a single pass; c) combining the regenerated sorbent with the primary portion of sulphided sorbent; and d) recycling the combined sorbent to the transport absorber: for the following method: i) feed gas is contacted with a particulated metallic zinc oxide-based sorbent in a transport absorber riser to form an effluent gas of reduced sulphide content and containing the sorbent in suspension; ii) the effluent gas and sorbent are separated; iii) the sorbent is regenerated by contacting it with oxygen-containing gas in a transport regenerator to form SO2 regeneration off-gas; iv) the sorbent and off-gas are separated; and v) the sorbent is recycled to the transport absorber riser.

USE - Fluid bed desulphurisation using a regenerable sorbent.
ADVANTAGE - The sorbent used is regenerable, and the off-gas can have a SO2 concentration suitable for sulphuric acid manufacture or redn. to sulphur.

Member(0007)
ABEQ EP 738538 B1 UPAB 20060131
An improvement for a sulphide-containing gas desulphurising method, comprising: a) separating the sulphided sorbent into a primary and secondary portion; b) contacting the secondary portion (of amount insufficient to produce an exothermic reaction producing a temperature of 700°C when contacted with oxygen in the transport regenerator) with oxygen -containing gas in the transport regenerator in a single pass; c) combining the regenerated sorbent with the primary portion of sulphided sorbent; and d) recycling the combined sorbent to the transport absorber: for the following method: i) feed gas is contacted with a particulated metallic zinc oxide-based sorbent in a transport absorber riser to form an effluent gas of reduced sulphide content and containing the sorbent in suspension; ii) the effluent gas and sorbent are separated; iii) the sorbent is regenerated by contacting it with oxygen-containing gas in a transport regenerator to form SO2 regeneration off-gas; iv) the sorbent and off-gas are separated; and v) the sorbent is recycled to the transport absorber riser.
USE - Fluid bed desulphurisation using a regenerable sorbent.
ADVANTAGE - The sorbent used is regenerable, and the off-gas can have a SO2 concentration suitable for sulphuric acid manufacture or redn. to sulphur.

L41 ANSWER 6 OF 6 WPIX COPYRIGHT 2009 THOMSON REUTERS on STN
ACCESSION NUMBER: 1973-74328U [49] WPIX
TITLE: Sulphuric acid prodn - by burning sulphur and two-stage contact oxidn and adsorption of sulphur trioxide
DERWENT CLASS: E36
INVENTOR: JENNIGES E
PATENT ASSIGNEE: (CZIE-C) CHEMIEBAU DR A ZIEREN GMB; (POGC-C) DAVY POWERGAS GMBH
COUNTRY COUNT: 5

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
DE 2223131	A		(197349)*	DE		
NL 7306257	A		(197349)	NL		
JP 49048596	A	19740510	(197428)	JA		
US 3907979	A	19750923	(197540)	EN		
GB 1431188	A	19760407	(197615)	EN		
DE 2223131	B	19790215	(197908)	DE		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
DE 2223131 A		DE 1972-2223131	19720512

PRIORITY APPLN. INFO: DE 1972-2223131 19720512
INT. PATENT CLASSIF.:
IPC RECLASSIF.: C01B0017-00 [I,C]; C01B0017-76 [I,A]; C01B0017-765 [I,A]

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ECLA:                C01B0017-765B
USCLASS NCLM:        423/522.000
        NCLS:        423/533.000; 423/542.000
JAP. PATENT CLASSIF.:
     MAIN/SEC.:      C01B0017-76 Z
FTERM CLASSIF.:      4G043
BASIC ABSTRACT:
            DE 2223131 A   UPAB: 20051229
             Sulphur is burnt at 900 - 3000 degrees C; the combustion gases are
cooled to 110-350 degrees C. a part of them is returned to the burning stage;
oxygen is added to the other part of the combustion gases in an at least
stoichiometric amt w.r.t. the contact oxidation stage; the contact oxidation is
executed, the resulting gas mixture is cooled to 80-220 degrees C, SO3 is absorbed,
the remaining gas mixture is heated to 400-450 degrees C, a part of it is returned
to the contact oxidation stage, the other part is passed to an additional contact
oxidation stage and, after cooling to an additional absorber. Thus the total
conversion of SO2 to SO3 is increased to >99.9%. MANUAL CODE:          CPI: E31-F


=> d his l44

     (FILE 'HCAPLUS' ENTERED AT 15:51:56 ON 14 OCT 2009)
L44          12 S L29 NOT L43

     FILE 'STNGUIDE' ENTERED AT 15:52:24 ON 14 OCT 2009

     FILE 'WPIX' ENTERED AT 15:53:28 ON 14 OCT 2009

     FILE 'STNGUIDE' ENTERED AT 15:53:32 ON 14 OCT 2009

=> d que l44
L3            1 SEA FILE=REGISTRY ABB=ON  PLU=ON  7782-44-7/RN
L5       187800 SEA FILE=HCAPLUS ABB=ON  PLU=ON  (SULFURIC OR SULPHURIC) (W)
                ACID
L9        83235 SEA FILE=HCAPLUS ABB=ON  PLU=ON  (SULFUR OR SULPHUR) (W)
                (DIOXIDE)
L11      910900 SEA FILE=HCAPLUS ABB=ON  PLU=ON  OXYGEN
L12       67368 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L3 (L) (RCT OR RACT)/RL
L13       12693 SEA FILE=HCAPLUS ABB=ON  PLU=ON  (SULFUR OR SULPHUR) (W)
                (TRIOXIDE)
L14      110834 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L5 AND (PREP? OR PRODUC? OR
                PROCEDURE? OR SYNTHES? OR MAKE# OR MADE OR MAKING)
L15        4231 SEA FILE=HCAPLUS ABB=ON  PLU=ON  (CONTACT?) (2A) (STAGE# OR
                MAIN OR PRIMAR? OR SECONDAR?)
L16         163 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L11 AND L15
L17           6 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L14 AND L16
L18          39 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L9 (S) (FEED GAS?)
L19          10 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L18 AND L14
L23           2 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L17 AND ABSORB?
L24           5 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L19 AND ABSORB?
L25           7 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L23 OR L24
L26          12 SEA FILE=HCAPLUS ABB=ON  PLU=ON  (L17 OR L19) AND (L11 OR L12
                OR L13)
L27          14 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L25 OR L26
L28           4 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L27 AND (VOLUME# OR VOL# OR
                PERCENT# OR PCT# OR CONTENT#)
L29          14 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L27 OR L28
L43           8 SEA FILE=WPIX ABB=ON  PLU=ON  (WO2003-EP11659/AP OR WO2005-EP37
                98/AP OR WO2007-EP8910/AP OR EP1995-105760/AP OR AU2003-274054/
                AP OR AU2003274054/PN OR CA1995-2146886/AP OR CA2007-2668059/AP
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OR CA2146886/PN OR CN1995-105723/AP OR DE2223131/PN OR EP738538/PN OR JP1995-107626/AP OR TW2003-128992/AP OR WO2008052649/PN OR AU2005-238149/AP OR AU2005238149/PN OR AU2007-315318/AP OR AU2007315318/PN OR BR2003-15534/AP OR BR2003015534/PN OR BR2005-10676/AP OR BR2005010676/PN OR CA2668059/PN OR CN101001808/PN OR "CN1090518 C"/PN OR CN1135371/PN OR CN1708453/PN OR CN2003-80102005/AP OR CN2005-80014112/AP OR DE102004022506/PN OR DE102006051899/PN OR DE10249782/PN OR DE1972-2223131/AP OR DE1995-69503221/AP OR DE2002-10249782/AP OR DE2004-102004022506/AP OR DE2006-102006051899/AP OR DE69503221/PN OR EP1565402/PN OR EP1742869/PN OR EP1979270/PN OR EP2003-758033/AP OR EP2005-716570/AP OR EP2007-818981/AP OR FR2005-51177/AP OR FR2869892/PN OR GB1431188/PN OR IN2005-MN302/AP OR IN2005MN00302/PN OR IN2006-MN1245/AP OR IN2006MN01245/PN OR JP08299741/PN OR JP2004-545919/AP OR JP2006503782/PN OR "JP3665382 B"/PN OR JP49048596/PN OR KR1995-11060/AP OR KR2005-707061/AP OR KR2005073578/PN OR KR367313/PN OR NL7306257/PN OR NO2009-1768/AP OR NO20090001768/PN OR TW2004013246/PN OR "TW250125 B"/PN OR US1993-90420/AP OR US1993-90601/AP OR US1994-206569/AP OR US2006-532326/AP OR US20060245997/PN OR US2007-579435/AP OR US20080145290/PN OR US3907979/PN OR US5447702/PN OR WO2004037719/PN OR WO2005105666/PN OR WO2008-EP65044/AP OR WO2009060022/PN OR ZA1995-3129/AP OR ZA2005-3289/AP OR ZA2005003289/PN OR ZA2006-9163/AP OR ZA2006009163/PN OR ZA9503129/PN)

L44 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L29 NOT L43

=> d 144 1-12 ibib abs hitind

L44 ANSWER 1 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN

ACCESSION NUMBER: 2008:1508495 HCAPLUS Full-text

DOCUMENT NUMBER: 150:21777

TITLE: Process and apparatus for mixing gases for producing SO3

INVENTOR(S): Daum, Karl-Heinz; Schalk, Wolfram; Cachero Ventosa, David

PATENT ASSIGNEE(S): Outotec Oyj, Finland

SOURCE: PCT Int. Appl., 18pp.
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2008151758	A2	20081218	WO 2008-EP4510	20080606
WO 2008151758	A3	20090611		

W: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW,

AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA
DE 102007027881 A1 20081218 DE 2007-102007027881 20070613
PRIORITY APPLN. INFO.: DE 2007-102007027881A 20070613
AB When mixing two gases of different temperature and/or composition in a converter for producing SO3 from an SO2-containing gas, a 1st SO2-containing gas flow is introduced into the converter through a central supply pipe and passed through an integrated heat exchanger arranged around the central supply pipe, which is traversed by the 1st gas flow from the bottom to the top. A 2nd gas flow is supplied via a ring conduit arranged above the integrated heat exchanger, from which the 2nd gas flow is discharged through multiple openings and is fed into the 1st gas flow, so that it mixes with the same. Then, the gas mixture obtained is supplied to a contact stage of the converter, in which the SO2 is at least partly converted to SO3 on a catalyst.
CC 49-2 (Industrial Inorganic Chemicals)
Section cross-reference(s): 47
ST reactor sulfur dioxide oxygen mixing trioxide prodn catalyst
IT Reactors
(catalytic; process and apparatus for mixing gases for producing SO3)
IT Heat exchangers
Mixing
(process and apparatus for mixing gases for producing SO3)
IT 7664-93-9P, Sulfuric acid, preparation
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(process and apparatus for mixing gases for producing SO3)
IT 7446-11-9P, Sulfur trioxide, preparation
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); RCT (Reactant); PREP (Preparation); PROC (Process); RACT (Reactant or reagent)
(process and apparatus for mixing gases for producing SO3)
IT 7446-09-5, Sulfur dioxide, reactions 7782-44-7, Oxygen, reactions
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(process and apparatus for mixing gases for producing SO3)

L44 ANSWER 2 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2008:1502213 HCAPLUS Full-text
DOCUMENT NUMBER: 150:21774
TITLE: Process and apparatus for mixing gases for producing SO3
INVENTOR(S): Daum, Karl-Heinz; Schalk, Wolfram; Ventosa, David Cachero
PATENT ASSIGNEE(S): Outotec Oyj, Finland
SOURCE: Ger. Offen., 9pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102007027881	A1	20081218	DE 2007-102007027881	20070613
WO 2008151758	A2	20081218	WO 2008-EP4510	20080606
WO 2008151758	A3	20090611		

W: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES,

FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA

PRIORITY APPLN. INFO.: DE 2007-102007027881A 20070613

AB When mixing two gases of different temperature and/or composition in a converter for producing SO3 from an SO2-containing gas, a 1st SO2-containing gas flow is introduced into the converter through a central supply pipe and passed through an integrated heat exchanger arranged around the central supply pipe, which is traversed by the 1st gas flow from the bottom to the top. A 2nd gas flow is supplied via a ring conduit arranged above the integrated heat exchanger, from which the 2nd gas flow is discharged through multiple openings and is fed into the 1st gas flow, so that it mixes with the same. Then, the gas mixture obtained is supplied to a contact stage of the converter, in which the SO2 is at least partly converted to SO3 on a catalyst.

CC 49-2 (Industrial Inorganic Chemicals)
Section cross-reference(s): 47

ST reactor sulfur dioxide oxygen mixing trioxide prodn catalyst

IT Reactors
(catalytic; process and apparatus for mixing gases for producing SO3)

IT Heat exchangers
Mixing
(process and apparatus for mixing gases for producing SO3)

IT 7664-93-9P, Sulfuric acid, preparation
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(process and apparatus for mixing gases for producing SO3)

IT 7446-11-9P, Sulfur trioxide, preparation
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); RCT (Reactant); PREP (Preparation); PROC (Process); RACT (Reactant or reagent)
(process and apparatus for mixing gases for producing SO3)

IT 7446-09-5, Sulfur oxide (SO2), reactions 7782-44-7, Oxygen, reactions
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(process and apparatus for mixing gases for producing SO3)

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 3 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2008:124901 HCAPLUS Full-text
DOCUMENT NUMBER: 148:194557
TITLE: Production of nitric and sulfuric acid from flue gases
INVENTOR(S): O'Brien, Robert Neville
PATENT ASSIGNEE(S): Can.
SOURCE: U.S. Pat. Appl. Publ., 7 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20080025910	A1	20080131	US 2006-493299	20060727
PRIORITY APPLN. INFO.:			US 2006-493299	20060727

AB Stirred acid resistant shallow cylindrical reactors are used to produce both nitric and sulfuric acid from a feed gas stream containing both sulfur dioxide and nitrogen oxides passed over or through the mixed acids. The homogeneous catalytic mixture of sulfuric and nitric acids uses the highly oxidizing nitrosyl ion to further oxidize the gaseous oxide stream to sulfuric and nitric acids. Oxygen or air then oxidizes the nitrosyl ion reduction products back to nitrosyl ion for further reaction. The acids are separated by distillation, and concentrated using heat from the burner and the reaction heat. The modified sulfur burner used operates at temps. to oxidize some of the nitrogen in the air. The temperature required may be obtained by increasing the oxygen of the air by pure oxygen. More nitrogen oxides may be produced by a glow discharge into the burner air or burning of ammonia. Any heavy metals, such as mercury, will be 1st oxidized then precipitated as sulfates.

INCL 423523000; 423393000

CC 49-2 (Industrial Inorganic Chemicals)
Section cross-reference(s): 59

ST nitric sulfuric acid prodn flue gas sulfur nitrogen oxide; heat transfer distn sepn nitric sulfuric acid prodn

IT Distillation
Flue gases
Glow discharge
Heat transfer
Oxidation
(production of nitric and sulfuric acid from flue gases)

IT Heavy metals
RL: PEP (Physical, engineering or chemical process); REM (Removal or disposal); PROC (Process)
(production of nitric and sulfuric acid from flue gases)

IT 7704-34-9, Sulfur, reactions
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(combustion; production of nitric and sulfuric acid from flue gases)

IT 7727-37-9, Nitrogen, reactions
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(oxidation; production of nitric and sulfuric acid from flue gases)

IT 7446-09-5, Sulfur dioxide, reactions 11104-93-1, Nox, reactions
RL: FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); POL (Pollutant); RCT (Reactant); FORM (Formation, nonpreparative); OCCU (Occurrence); PROC (Process); RACT (Reactant or reagent)
(production of nitric and sulfuric acid from flue gases)

IT 7664-93-9P, Sulfuric acid, preparation
7697-37-2P, Nitric acid, preparation
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PUR (Purification or recovery); PREP (Preparation); PROC (Process)

(production of nitric and sulfuric acid from flue gases)
IT 7782-44-7, Oxygen, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(production of nitric and sulfuric acid from flue gases)
IT 7439-97-6, Mercury, processes
RL: PEP (Physical, engineering or chemical process); REM (Removal or disposal); PROC (Process)
(production of nitric and sulfuric acid from flue gases)

L44 ANSWER 4 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2007:444255 HCAPLUS Full-text
DOCUMENT NUMBER: 146:504475
TITLE: Method for extracting radioactive uranium from fly ash
INVENTOR(S): Li, Bake; Ge, Qiming
PATENT ASSIGNEE(S): Beijing Sipadun Mineral Resources Investment Consulting Co., Ltd., Peop. Rep. China
SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 16pp. CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 1948527	A	20070418	CN 2006-10137764	20061030
CN 100387734	C	20080514		
PRIORITY APPLN. INFO.:			CN 2006-10137764	20061030

AB The title method comprises the steps of: (1) crushing coal, washing, grinding, and combusting, (2) dissolving the combustion residue in sulfuric acid, (3) cooling the acid solution obtained in step 2, separating the solid substance, and washing, (4) removing organic and inorg. suspended matter, (5) performing ultrafine filtration, or filtering by RO membrane, (6) oxidizing U4+ to U6+, (7) extracting uranium in 2-ethylhexylphosphoric acid (DEPA) and TOPO solvent, (8) contacting the acid solution obtained in step 7 with dissolved Fe2+, reducing U6+ into U4+, and separating to obtain acid solution of U4+, (9) contacting acid solution of U4+ with oxidizer to obtain acid solution of U6+, (10) secondary-extracting in DEPA and TOPO solvent, and separating to obtain U6+ secondary extraction solution, (11) contacting the U6+ secondary extraction solution obtained in step 10 with diluted aqueous ammonium carbonate solution, and separating to obtain aqueous amino-uranium-based compound and tricarbon compound, (12) mixing the aqueous amino-uranium-based compound and tricarbon compound with water-insol. organic solvent to obtain DEPA, (13) acidifying to obtain acid solution with pH of 2, (14) separating to obtain DEPA waxy matter, and (15) mixing hydrogen peroxide (pH = 3.5-4.5) with water-soluble acid to obtain uranium-base peroxide, precipitating, and separating This method has the advantages of low cost of uranium production, little pollution, and low energy consumption.
CC 54-2 (Extractive Metallurgy)
IT 78-50-2, Trioctyl phosphine oxide 298-07-7 506-87-6, Ammonium carbonate 1314-56-3, Phosphorus pentoxide, uses 7439-89-6, Iron, uses 7440-44-0, Carbon, uses 7664-41-7, Ammonia, uses 7664-93-9, Sulfuric acid, uses 7722-84-1, Hydrogen peroxide, uses 7775-09-9, Sodium chlorate 7782-44-7, Oxygen, uses
RL: NUU (Other use, unclassified); USES (Uses)
(method for extracting radioactive uranium from fly ash)
IT 7440-61-1P, Uranium, preparation

RL: PEP (Physical, engineering or chemical process); PUR (Purification or recovery); PREP (Preparation); PROC (Process)
(method for extracting radioactive uranium from fly ash)

L44 ANSWER 5 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2007:444253 HCAPLUS Full-text
DOCUMENT NUMBER: 146:504474
TITLE: Method for extracting radioactive uranium from phosphate
INVENTOR(S): Li, Bake; Ge, Qiming
PATENT ASSIGNEE(S): Beijing Sipadun Mineral Resources Investment Consulting Co., Ltd., Peop. Rep. China
SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 15pp. CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 1948526	A	20070418	CN 2006-10137762	20061030
CN 100400687	C	20080709		
PRIORITY APPLN. INFO.:			CN 2006-10137762	20061030

AB The title method comprises the steps of: (1) dissolving phosphate in sulfuric acid, (2) cooling the acid solution obtained in step 1, separating, and washing the solid substance, (3) removing organic and inorg. suspended matter, (4) performing ultrafine filtration, or filtering by RO membrane, (5) oxidizing U4+ into U6+, (6) extracting uranium in 2-ethylhexylphosphoric acid (DEPA) and TOPO solvent, (7) contacting the acid solution obtained in step 6 with dissolved Fe2+, reducing U6+ into U4+, and separating to obtain U4+ acid solution, (8) contacting U4+ acid solution with oxidizer to obtain U6+ acid solution, (9) secondary-extracting in DEPA and TOPO solvent, and separating to obtain U6+ secondary extraction solution, (10) contacting the U6+ secondary extraction solution obtained in step 9 with diluted aqueous ammonium carbonate solution, and separating to obtain aqueous amino-uranium-based compound and tricarbon compound, (11) mixing the aqueous amino-uranium-based compound and tricarbon compound with water-insol. organic solvent to obtain DEPA, (12) acidifying to obtain acid solution with pH of 2, (13) separating to obtain DEPA waxy matter, and (14) mixing with hydrogen peroxide (pH = 3.5-4.5) and water-soluble acid to obtain uranium-based peroxide, precipitating, and separating This method has the advantages of low cost of uranium production, little pollution, and low energy consumption.
CC 54-2 (Extractive Metallurgy)
Section cross-reference(s): 71
IT 78-50-2, Trioctyl phosphine oxide 298-07-7 506-87-6, Ammonium carbonate 1314-56-3, Phosphorus pentoxide, uses 7439-89-6, Iron, uses 7440-44-0, Carbon, uses 7664-41-7, Ammonia, uses 7664-93-9, Sulfuric acid, uses 7722-84-1, Hydrogen peroxide, uses 7775-09-9, Sodium chlorate 7782-44-7, Oxygen, uses
RL: NUU (Other use, unclassified); USES (Uses)
(method for extracting radioactive uranium from phosphate)
IT 7440-61-1P, Uranium, preparation
RL: PEP (Physical, engineering or chemical process); PUR (Purification or recovery); PREP (Preparation); PROC (Process)
(method for extracting radioactive uranium from phosphate)

L44 ANSWER 6 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2005:140527 HCAPLUS Full-text
DOCUMENT NUMBER: 142:200939

TITLE: Production of sulphuric acid from a feed gas with varying concentration of sulphur dioxide
INVENTOR(S): Christensen, Kurt A.; Schoubye, Peter
PATENT ASSIGNEE(S): Haldor Topsoe A/S, Den.
SOURCE: U.S. Pat. Appl. Publ., 7 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20050036936	A1	20050217	US 2004-912169	20040806
US 7033565	B2	20060425		

PRIORITY APPLN. INFO.: DK 2003-1177 A 20030816

AB A process for the production of sulfuric acid from a sulfur dioxide containing feed gas with concentration of SO2 fluctuating between 0 and 100 mol% SO2 comprises the steps of contacting the feed gas with an aqueous solution comprising 0-50% by weight H2SO4 at a temperature between the f.p. of said aqueous solution and 50°; and during the contact of the feed gas with the aqueous solution absorbing at least a part of SO2 in the feed gas in the aqueous solution or desorbing at least a part of SO 2 from the aqueous solution, wherein the at least a part of SO2 is desorbed by stripping the aqueous solution with the feed gas.

IC ICM C01B017-69
INCL 423522000
CC 49-2 (Industrial Inorganic Chemicals)
ST sulfuric acid manuf feed gas varying concn sulfur dioxide
IT Absorption
(production of sulfuric acid from feed gas with varying concentration of sulfur dioxide)
IT Columns and Towers
(stripping; production of sulfuric acid from feed gas with varying concentration of sulfur dioxide)
IT 7446-09-5, Sulfur dioxide, reactions
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(production of sulfuric acid from feed gas with varying concentration of sulfur dioxide)
IT 7664-93-9P, Sulfuric acid, preparation
RL: IMF (Industrial manufacture); PREP (Preparation)
(production of sulfuric acid from feed gas with varying concentration of sulfur dioxide)
REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 7 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2001:319818 HCAPLUS Full-text
DOCUMENT NUMBER: 134:328558
TITLE: Process for manufacture of sulfur
INVENTOR(S): Burmaster, Brian M.; Goar, B. Gene
PATENT ASSIGNEE(S): Monsanto Company, USA

SOURCE: PCT Int. Appl., 46 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001030692	A2	20010503	WO 2000-US29022	20001020
WO 2001030692	A3	20020124		
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
CA 2386336	A1	20010503	CA 2000-2386336	20001020
CA 2386336	C	20090414		
AU 2000080301	A	20010508	AU 2000-80301	20001020
BR 2000014908	A	20020611	BR 2000-14908	20001020
EP 1230149	A2	20020814	EP 2000-970999	20001020
EP 1230149	B1	20051214		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL				
JP 2003512285	T	20030402	JP 2001-533052	20001020
US 6776974	B1	20040817	US 2000-693418	20001020
AT 312797	T	20051215	AT 2000-970999	20001020
EP 1642864	A2	20060405	EP 2005-26241	20001020
EP 1642864	A3	20060517		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY				
ES 2255511	T3	20060701	ES 2000-970999	20001020
ZA 2002002424	A	20030626	ZA 2002-2424	20020326
IN 2002CN00561	A	20090306	IN 2002-CN561	20020418
MX 2002003965	A	20021023	MX 2002-3965	20020419

PRIORITY APPLN. INFO.: US 1999-160974P P 19991022
EP 2000-970999 A3 20001020
WO 2000-US29022 W 20001020

AB A process is provided for producing elemental sulfur from hydrogen sulfide contained in an acid gas feed stream wherein hydrogen sulfide and sulfur dioxide are reacted in a catalytic only sulfur recovery unit comprising a single catalytic converter containing a Claus catalytic reaction zone. A sulfur dioxide-enriched gas recovered from tail gas treatment is recycled and introduced into the catalytic reaction zone as part of a feed gas mixture that also includes the acid gas feed stream. Temps. within the catalytic reaction zone are effectively moderated by recycle of tail gas effluent to the converter so that high concns. of hydrogen sulfide in the acid gas feed stream can be tolerated and improved process flexibility and capacity are realized. A pretreatment process including contacting the acid gas with an aqueous acid wash to reduce the concentration of unsatd. hydrocarbons in the acid gas and inhibit deactivation of the oxidation catalyst is also disclosed.

IC ICM C01B017-04
CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 59

IT Absorbents
(liquid; process for manufacture of sulfur from hydrogen sulfide contained in

acid gases)
IT 78-46-6, Dibutyl butyl phosphonate 143-24-8, Tetraethyleneglycol dimethylether
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(absorbent; process for manufacture of sulfur from hydrogen sulfide contained in acid gases)
IT 7704-34-9P, Sulfur, preparation
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PUR (Purification or recovery); PREP (Preparation); PROC (Process)
(process for manufacture of sulfur from hydrogen sulfide contained in acid gases)
IT 108-88-3, Toluene, processes 1330-20-7, Xylene, processes 7664-93-9, Sulfuric acid, processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(process for manufacture of sulfur from hydrogen sulfide contained in acid gases)
OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (3 CITINGS)
REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 8 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 1999:266104 HCAPLUS Full-text
DOCUMENT NUMBER: 131:9014
TITLE: Effect of feed gas composition on the rate of carbon oxidation with Pt/SiO2 and the oxidation mechanism
AUTHOR(S): Oi-Uchisawa, Junko; Obuchi, Akira; Ogata, Atsushi; Enomoto, Ryuji; Kushiyama, Satoshi
CORPORATE SOURCE: Atmospheric Environmental Protection Department, National Institute for Resources and Environment, Tsukuba, 305-8569, Japan
SOURCE: Applied Catalysis, B: Environmental (1999), 21(1), 9-17
CODEN: ACBEE3; ISSN: 0926-3373
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The effect of NO, SO2 and H2O concns. on the rate of carbon oxidation with a Pt/SiO2 catalyst and the mechanisms of the reactions were studied. Addition of NO to the reactant gas enhanced the oxidation rate of carbon black. Furthermore, the addition of trace quantities of SO2 (approx. 8 ppm) to the reactant gas containing NO and H2O substantially enhanced the oxidation rate while it had no effect in the absence of NO. Nitrogen dioxide was thought to be an oxidizer that directly attacks the carbon and turns itself into NO. The promotional effect of SO2 was attributed to SO3 (or H2SO4), produced from SO2 over Pt, which may work as a catalyst that accelerates the oxidation of carbon by NO2. H2O may be indispensable as a reactant for hydrolysis involved in this promoted oxidation and reaction.
CC 60-3 (Waste Treatment and Disposal)
Section cross-reference(s): 51, 67
ST carbon black platinum oxidn catalyst mechanism; nitric oxide mechanism carbon black oxidn; sulfur dioxide trioxide mechanism carbon black oxidn; water mechanism carbon black oxidn; sulfuric acid mechanism carbon black oxidn; diesel exhaust catalytic oxidn carbon black
IT 124-38-9, Carbon dioxide, processes 630-08-0, Carbon monoxide, processes 7446-11-9, Sulfur trioxide, processes 7664-93-9, Sulfuric acid, processes

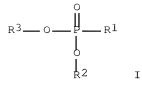
RL: FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); POL (Pollutant); FORM (Formation, nonpreparative); OCCU (Occurrence); PROC (Process)
(feed gas composition effect on rate of carbon oxidation with Pt/SiO2 and oxidation mechanism)
IT 7446-09-5, Sulfur dioxide, reactions 10102-43-9, Nitric oxide, reactions
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); POL (Pollutant); RCT (Reactant); REM (Removal or disposal); OCCU (Occurrence); PROC (Process); RACT (Reactant or reagent); USES (Uses)
(feed gas composition effect on rate of carbon oxidation with Pt/SiO2 and oxidation mechanism)
OS.CITING REF COUNT: 22 THERE ARE 22 CAPLUS RECORDS THAT CITE THIS RECORD (22 CITINGS)
REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 9 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 1998:169499 HCAPLUS Full-text
DOCUMENT NUMBER: 128:221028
ORIGINAL REFERENCE NO.: 128:43725a,43728a
TITLE: Selective removal and recovery of sulfur dioxide from effluent gases using organic phosphorous solvents
INVENTOR(S): Burmaster, Brian M.; McAlister, Donald R.
PATENT ASSIGNEE(S): Monsanto Company, USA
SOURCE: PCT Int. Appl., 39 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9809713	A1	19980312	WO 1997-US14283	19970812
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW				
RW: GH, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
US 5851265	A	19981222	US 1996-707344	19960903
CA 2264844	A1	19980312	CA 1997-2264844	19970812
AU 9741504	A	19980326	AU 1997-41504	19970812
AU 716416	B2	20000224		
CN 1228715	A	19990915	CN 1997-197623	19970812
CN 1103624	C	20030326		
EP 951338	A1	19991027	EP 1997-939409	19970812
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
BR 9713190	A	19991103	BR 1997-13190	19970812
JP 2001500055	T	20010109	JP 1998-512672	19970812
ZA 9707408	A	19990518	ZA 1997-7408	19970818

PRIORITY APPLN. INFO.: US 1996-707344 A 19960903
WO 1997-US14283 W 19970812

OTHER SOURCE(S): MARPAT 128:221028
GI



I

AB A process for the selective removal and recovery of sulfur dioxide from effluent gases is disclosed. The sulfur dioxide is recovered in a sulfur dioxide absorption/desorption cycle which utilizes a liquid solvent to selectively absorb sulfur dioxide from the effluent gas. The liquid solvent comprises an organic phosphorous compound selected from phosphate triesters, phosphonate diesters, phosphinate monoesters and mixts. thereof. Preferably, the liquid solvent comprises phosphonate diesters I, wherein R1, R2 and R3 are independently aryl or C1 to C8 alkyl. The organic phosphonate diesters are substantially water immiscible, the solubility of water in the organic phosphonate diester is <10 weight% at 25°, and have a vapor pressure <1 Pa at 50°. In accordance with a preferred embodiment, the liquid solvent comprises di-Bu Bu phosphonate. The absorbed sulfur dioxide is subsequently stripped to regenerate the organic phosphorous solvent and produce a gas enriched in sulfur dioxide content. The sulfur dioxide -enriched gas may be used as part of the feed gas to a contact sulfuric acid plant or a Claus plant for the preparation of elemental sulfur or be cooled to condense sulfur dioxide in the form of a liquid product. The invention is particularly useful in producing a sulfur dioxide-enriched gas from gases relatively weak in sulfur dioxide content.

IC ICM B01D053-50
ICS C01B017-60; C01B017-76

CC 59-4 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 49

IT 7664-93-9P, Sulfuric acid, preparation
RL: IMF (Industrial manufacture); PREP (Preparation)
(selective removal and recovery of sulfur dioxide from effluent gases using organic phosphorous solvents)

IT 7446-11-9, Sulfur trioxide, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(selective removal and recovery of sulfur dioxide from effluent gases using organic phosphorous solvents)

REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 10 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 1994:110859 HCAPLUS Full-text
DOCUMENT NUMBER: 120:110859
ORIGINAL REFERENCE NO.: 120:19527a,19530a
TITLE: Manufacture of sulfuric acid from sulfur dioxide-containing feed gas
INVENTOR(S): Jensen-Holm, Hans
PATENT ASSIGNEE(S): Haldor Topsoe A/S, Den.
SOURCE: Eur. Pat. Appl., 5 pp.
CODEN: EPXXDW

DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 570324	A1	19931118	EP 1993-610028	19930430
R: DE, DK, FR, GB, IT, NL				
PRIORITY APPLN. INFO.:			DK 1992-618 A	19920512

AB In this process, comprising catalytically oxidizing the SO2 in the feed gas to SO3, and hydrating the SO3 in gas to H2SO4, the SO2-containing feed gas is divided into a 1st and 2nd portion in ratio 1:4 to 4:1, the 1st portion of the feed gas is diluted with a gas to a SO2 concentration by which no excessive heat is developed in a subsequent 1st catalytic oxidation, and subjecting the diluted gas to the 1st catalytic oxidation, recombining the oxidized 1st gas portion with the 2nd portion of the feed gas, and subjecting the recombined gas to the 2nd catalytic oxidation This method prevents overheating of the oxidation catalyst and/or materials of construction of the plant.

IC ICM C01B017-765
CC 49-2 (Industrial Inorganic Chemicals)
ST sulfur dioxide oxidn catalyst trioxide; sulfuric acid sulfur trioxide hydration; VK58 oxidn catalyst sulfur dioxide; vanadium pentoxide oxidn catalyst; cesium promotor vanadium pentoxide
IT Oxidation catalysts
(sulfur trioxide formation in presence of, from sulfur dioxide, in sulfuric acid manufacture, feed gas splitting in, for catalyst and equipment overheating prevention)
IT 7446-11-9P, Sulfur trioxide, reactions
RL: FORM (Formation, nonpreparative); PREP (Preparation)
(formation of, by catalytic oxidation of sulfur dioxide in sulfuric acid manufacture, feed gas splitting in, for catalyst and equipment overheating prevention)
IT 7664-93-9P, Sulfuric acid, preparation
RL: IMF (Industrial manufacture); PREP (Preparation)
(manufacture of, catalytic oxidation of sulfur dioxide in, feed gas splitting in, for catalyst and equipment overheating prevention)
IT 52110-04-0, Cesium vanadium oxide 152987-94-5, VK 58 (catalyst)
RL: CAT (Catalyst use); USES (Uses)
(oxidation catalyst, sulfur trioxide formation in presence of, from sulfur dioxide, in sulfuric acid manufacture, feed gas splitting in, for catalyst and equipment overheating prevention)
IT 7446-09-5P, Sulfur dioxide, reactions
RL: RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(oxidation of, catalytic, in sulfuric acid manufacture, feed gas splitting in, for catalyst and equipment overheating prevention)
OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L44 ANSWER 11 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 1989:517753 HCAPLUS Full-text
DOCUMENT NUMBER: 111:117753
ORIGINAL REFERENCE NO.: 111:19717a,19720a
TITLE: Manufacture of titanium dioxide
INVENTOR(S): Hartmann, Achim

PATENT ASSIGNEE(S): Kronos Titan G.m.b.H., Fed. Rep. Ger.
SOURCE: Eur. Pat. Appl., 12 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 320682	A2	19890621	EP 1988-119750	19881126
EP 320682	A3	19900321		
EP 320682	B1	19921021		
EP 320682	B2	19950125		
R: DE, ES, FR, GB, IT				
DE 3742838	A1	19890713	DE 1987-3742838	19871217
ES 2035227	T3	19930416	ES 1988-119750	19881126
US 5409679	A	19950425	US 1990-548017	19900705
PRIORITY APPLN. INFO.:			DE 1987-3742838 A	19871217
			US 1988-285432 B1	19881216

AB The title process comprises (a) treating an offgas containing SO2 and ≥8 volume % O (based on dry gas) with a wash solution containing small amts. of H2SO4 and Fe sulfate, during which the major part of the SO2 is absorbed in the filtrate and converted into H2SO4, resulting in a process liquid having increased H2SO4 content, and (b) recycling the resulting process liquid to the TiO2 manufacturing process. The treatment of the offgas is carried out in ≥2 serially arranged scrubbing towers by feeding the untreated offgas to the 1st and the fresh wash liquid from the TiO2 manufacture to the last scrubbing stage, countercurrently contacting the offgas in the successive scrubbing towers with a wash liquid spray so that the H2SO4 concentration decreases in the successive scrubbing stages, and and withdrawing the purified offgas from the last, and the H2SO4-containing process solution from the 1st scrubbers. This method decreases environmental pollution and allows the utilization of the resulting S compds.

IC ICM B01D053-34
ICS C22B034-12; C22B007-02
CC 49-3 (Industrial Inorganic Chemicals)
Section cross-reference(s): 59
ST titanyl sulfate thermal hydrolysis titania; sulfur dioxide titanyl sulfate decompn; scrubbing sulfur dioxide sulfuric acid; oxygen sulfur dioxide sulfuric acid
IT Absorption
(of sulfur dioxide, from oxygen-containing offgas from titanyl sulfate thermal hydrolysis)
IT 7446-09-5, Sulfur dioxide, properties
RL: PRP (Properties)
(absorption of, from oxygen-containing offgas from titanyl sulfate thermal hydrolysis, for sulfuric acid)
IT 7664-93-9P, Sulfuric acid, preparation
RL: FORM (Formation, nonpreparative); PREP (Preparation)
(formation of, from oxygen-containing sulfur dioxide offgas, in titania manufacture)
IT 13463-67-7P, Titania, preparation
RL: IMF (Industrial manufacture); PREP (Preparation)
(manufacture of, process for)
IT 7782-44-7P, Oxygen, preparation
RL: PREP (Preparation)
(sulfur dioxide offgases containing, scrubbing of, for sulfuric acid)
OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD

(1 CITINGS)

L44 ANSWER 12 OF 12 HCAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 1987:216416 HCAPLUS Full-text
DOCUMENT NUMBER: 106:216416
ORIGINAL REFERENCE NO.: 106:35113a,35116a
TITLE: Sulfur trioxide absorption apparatus and process
INVENTOR(S): Cameron, Gordon M.
PATENT ASSIGNEE(S): CIL Inc., Can.
SOURCE: U.S., 7 pp.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 4654205	A	19870331	US 1986-819124	19860115
EP 230739	A1	19870805	EP 1986-309626	19861210
EP 230739	B1	19900404		
R: BE, DE, ES, FR, GB, GR, NL, SE				
AU 8666597	A	19870716	AU 1986-66597	19861216
AU 590035	B2	19891026		
ZA 8609495	A	19870930	ZA 1986-9495	19861218
FI 8700130	A	19870716	FI 1987-130	19870114
FI 81773	B	19900831		
FI 81773	C	19901210		
NO 8700149	A	19870716	NO 1987-149	19870114
NO 168416	B	19911111		
NO 168416	C	19920219		
JP 62167207	A	19870723	JP 1987-5204	19870114
CN 87100174	A	19870916	CN 1987-100174	19870115
PRIORITY APPLN. INFO.:			US 1986-819124 A	19860115

OTHER SOURCE(S): CASREACT 106:216416

AB The apparatus consists of a tower with distinct upper and a lower packed absorption zones. Substantially all of the SO3 is absorbed by the H2SO4 in the lower zone, while in the upper zone the depleted gas stream is significantly cooled. The 2 zones receive free acids of different temps. and different acid irrigation rates. The tower permits improved energy recovery while providing for environmentally acceptable emission stds. Thus, in a 2000 ton/day H2SO4 plant, a tower received a SO3 stream of 170°, obtained from the 93% conversion of an 11.5% SO2 stream. The common recirculating acid flow of 4000 gpm was divided over the lower zone (3600 gpm) of .apprx.140° and the upper zone (400 gpm) of 80°. The acid leaving the upper zone was at .apprx.140°. The combined very hot acid leaving the lower zone had a strength of 99.2% and a temperature of .apprx.175° before dilution, and a strength of 98.5% and a temperature of .apprx.180° after dilution The very hot acid is cooled to 140°. The SO3 absorption efficiency is >99.99%.

IC ICM C01B017-74
ICS C01B017-48; B01D050-00; B29C047-00
INCL 423522000
CC 49-2 (Industrial Inorganic Chemicals)
ST sulfur trioxide absorption app; sulfuric acid manuf sulfur trioxide
IT Absorption
(of sulfur trioxide, by sulfuric acid, 2-zone packed tower for, for sulfuric acid)

IT Absorption apparatus
(packed-column, two-zone, for sulfuric acid manufacture temperature control in)
IT 7446-11-9, Sulfur trioxide, properties
RL: PRP (Properties)
(absorption of, 2-zone packed absorption column for, for sulfuric acid)
IT 7446-09-5, Sulfur dioxide, uses and miscellaneous
7782-44-7, Oxygen, uses and miscellaneous
RL: USES (Uses)
(in sulfur trioxide absorption feed gas stream, in sulfuric acid manufacture)
IT 7664-93-9P, Sulfuric acid, preparation
RL: IMF (Industrial manufacture); PREP (Preparation)
(manufacture of, sulfur trioxide adsorption column for)
OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (3 CITINGS)
REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

******* SEARCH HISTORY *******

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=> d his nof

     (FILE 'HOME' ENTERED AT 14:38:31 ON 14 OCT 2009)

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     FILE 'REGISTRY' ENTERED AT 14:42:34 ON 14 OCT 2009
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L3             1 SEA ABB=ON  PLU=ON  7782-44-7/RN
L4             1 SEA ABB=ON  PLU=ON  7446-11-9/RN

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L6             1 SEA ABB=ON  PLU=ON  7664-93-9/RN

     FILE 'HCAPLUS' ENTERED AT 14:47:32 ON 14 OCT 2009

L7        132635 SEA ABB=ON  PLU=ON  L6
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L9         83235 SEA ABB=ON  PLU=ON  (SULFUR OR SULPHUR) (W) (DIOXIDE)
L10        11257 SEA ABB=ON  PLU=ON  L2 (L) (RCT OR RACT)/RL
L11       910900 SEA ABB=ON  PLU=ON  OXYGEN
L12        67368 SEA ABB=ON  PLU=ON  L3 (L) (RCT OR RACT)/RL
L13        12693 SEA ABB=ON  PLU=ON  (SULFUR OR SULPHUR) (W) (TRIOXIDE)
L14       110834 SEA ABB=ON  PLU=ON  L5 AND (PREP? OR PRODUC? OR PROCEDURE? OR
                 SYNTHES? OR MAKE# OR MADE OR MAKING)
L15         4231 SEA ABB=ON  PLU=ON  (CONTACT?) (2A) (STAGE# OR MAIN OR PRIMAR?
                 OR SECONDAR?)
L16          163 SEA ABB=ON  PLU=ON  L11 AND L15
L17            6 SEA ABB=ON  PLU=ON  L14 AND L16
L18           39 SEA ABB=ON  PLU=ON  L9 (S) (FEED GAS?)
L19           10 SEA ABB=ON  PLU=ON  L18 AND L14
L20        91256 SEA ABB=ON  PLU=ON  PARTIAL STREAM? OR UPSTREAM?
L21            0 SEA ABB=ON  PLU=ON  L17 AND L20
L22            0 SEA ABB=ON  PLU=ON  L19 AND L20
L23            2 SEA ABB=ON  PLU=ON  L17 AND ABSORB?
L24            5 SEA ABB=ON  PLU=ON  L19 AND ABSORB?
L25            7 SEA ABB=ON  PLU=ON  L23 OR L24
                 D SCA TI HIT

     FILE 'STNGUIDE' ENTERED AT 15:20:30 ON 14 OCT 2009

     FILE 'STNGUIDE' ENTERED AT 15:35:51 ON 14 OCT 2009

     FILE 'HCAPLUS' ENTERED AT 15:36:55 ON 14 OCT 2009
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L27           14 SEA ABB=ON  PLU=ON  L25 OR L26
L28            4 SEA ABB=ON  PLU=ON  L27 AND (VOLUME# OR VOL# OR PERCENT# OR
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L32            2 SEA ABB=ON  PLU=ON  L31 AND (FEED GAS?)
L33           13 SEA ABB=ON  PLU=ON  L31 AND (L9 OR L11 OR L13)
L34            4 SEA ABB=ON  PLU=ON  L31 AND L9
L35            5 SEA ABB=ON  PLU=ON  L31 AND L13
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                D SCA L35
L36            6 SEA ABB=ON  PLU=ON  L32 OR L34 OR L35
L37            7 SEA ABB=ON  PLU=ON  L33 AND (VOLUME# OR VOL# OR PERCENT# OR
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                D SCA
L39            7 SEA ABB=ON  PLU=ON  L38 NOT CARBON SILICA
L40            6 SEA ABB=ON  PLU=ON  L39 NOT SODIUM SULFATE
L41            6 SEA ABB=ON  PLU=ON  L36 OR L40
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                D KWIC

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     FILE 'WPIX' ENTERED AT 15:51:39 ON 14 OCT 2009
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                KR20050073578/PN OR KR367313/PN OR NL7306257/PN OR NO2009-1768/A
                P OR NO20090001768/PN OR TW2004013246/PN OR "TW250125 B"/PN OR
                US1993-90420/AP OR US1993-90601/AP OR US1994-206569/AP OR
                US2006-532326/AP OR US20060245997/PN OR US2007-579435/AP OR
                US20080145290/PN OR US3907979/PN OR US5447702/PN OR WO200403771
                9/PN OR WO2005105666/PN OR WO2008-EP65044/AP OR WO2009060022/PN
                 OR ZA1995-3129/AP OR ZA2005-3289/AP OR ZA2005003289/PN OR
                ZA2006-9163/AP OR ZA2006009163/PN OR ZA9503129/PN)
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